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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/808,229	COX, DAVID M.	
	Examiner	Art Unit	
	Christine T. Mui	1709	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-37* is/are pending in the application.

4a) Of the above claim(s) *34-37* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 March 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *See Continuation Sheet*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :03 May 2004; 31 October 2006; 22 December 2006;.

DETAILED ACTION

Election/Restrictions

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

   I. Claims 1-33, drawn to product, classified in class 422, subclass 103.

   II. Claims 34-37, drawn to process of use, classified in class 436, subclass 045.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product. See MPEP § 806.05(h). In the instant case the product as claimed can be used in a materially different process of using that product.

3. The device claimed can be used to perform a purification process using centrifugation or filtration. During centrifugation or filtration, components of a mixture or sample can be separated. The device as claimed can also be used to in the detection of particulates in a sample through separation.

4.

Restriction for examination purposes as indicated is proper because all these inventions listed in this action are independent or distinct for the reasons given above and there would be a serious search and examination burden if restriction were not required because one or more of the following reasons apply:

(a) the inventions have acquired a separate status in the art in view of their different classification;

(b) the inventions have acquired a separate status in the art due to their recognized divergent subject matter;

(c) the inventions require a different field of search (for example, searching different classes/subclasses or electronic resources, or employing different search queries);

(d) the prior art applicable to one invention would not likely be applicable to another invention;

(e) the inventions are likely to raise different non-prior art issues under 35 U.S.C. 101 and/or 35 U.S.C. 112, first paragraph.

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a invention to be examined even though the requirement may be traversed (37 CFR 1.143) **and (ii) identification of the claims encompassing the elected invention.**

The election of an invention may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be

treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable on the elected invention.

If claims are added after the election, applicant must indicate which of these claims are readable upon the elected invention.

Should applicant traverse on the ground that the inventions are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

5. During a telephone conversation with Leonard Bowersox on 22 August 2007 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-33. Affirmation of this election must be made by applicant in replying to this Office action. Claims 34-37 withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Specification

6. The disclosure is objected to because of the following informalities:

7. On page 6, [00023], line 5, in the instance where it reads, "shown in in" probably should read "shown in"

8. On page 6, [00023], line 10, in the instance where it reads, "and causing" probably should read "and cause".

Appropriate correction is required.

Drawings

9. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description:

10. On page 14, [00042], line 8 and 11, opening deformer "36" is not included in Figure 6;

11. On page 14, [00042], line 10, tip portion "38" is not included in Figure 6;

12. On page 16, [00047], line 2, the device "100" is not included in Figures 4 and 6;

13. On page 17, [00047], line 1, the gas trap "60" is not included in Figure 6;

14. On page 20, [00056], line 2, the portion "64" and recess"62" is not included in Figure 2;

15. On page 20, [00056], the recess "62" is not included in Figures 7 and 8

16. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet

submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-3, 5 and 14 are rejected under 35 U.S.C. 102(e) as being anticipated by US Publication No. 2007/0041878 A1 to Bryning (herein referred "Bryning").

3. Regarding claim 1, the reference Bryning discloses a microfluidic assembly and system for manipulating fluid samples (see abstract). The microfluidic manipulation assembly that is provided has a fluid manipulating assembly (top surface) and an assembly support platform. The fluid manipulating assembly is on the assembly support platform (bottom surface). The fluid manipulation assembly that is provided has

two or more recesses (processing pathways) separated by one or more intermediate walls. In various embodiments of the assembly, the recesses are partially defined by an opposing wall surface portion. It is interpreted by the examiner that the recesses defined by the opposing wall portion are at least partially defined by the substrate. Referring to Figures 17-29, there is an inlet chamber 302 that can be used as a polymerase chain reaction setup well (first sample containment feature with inlet and outlet) that flows into a channel. At the opposite end of the assembly, the is a reverse sequencing reaction product chamber 326 (reservoir) that is in fluid communication with the inlet through a series of sequential chambers and channels (see [0004, 0005, 0009, 0134, 0135]).

4. Regarding claim 2, the reference Bryning discloses that in the microfluidic assembly in Figures 17-29, after the inlet chamber 302 there is a PCR inlet channel in an open position at 304 (first valve). Under centripetal force a sample in the inlet chamber 302 can be forced through the inlet channel 304 into a polymerase chain reaction chamber 306 (upstream containment feature) (see [0134]).

5. Regarding claim 3,the reference Bryning discloses the microfluidic assembly having a pathway for processing a sample with various embodiments, including chambers and channels (see [0127]; Figure 17). It is interpreted by the examiner that the plurality of chambers and channels that a sample passes through to the forward or reverse sequencing reaction chambers at the distal portion of the assembly is considered a manifold where there are many different parts or features.

6. Regarding claim 5, the reference Bryning discloses that once the assembly is subjected to sufficient thermal cycling for PCR in the PCR chamber 306, a blocked or closed PCR outlet channel 308 (second valve) is opened and under centripetal force the PCR product from PCR chamber 306 into the PCR purification column 310 (downstream sample containment feature).

7. Regarding claim 14, the reference Bryning discloses the fluid manipulation assembly with two or more recesses. The recesses are in the form of inlet and outlet channels, to and from PCR reaction chambers and columns. The PCR inlet chamber in the assembly can be see as 304, 308 and 318 (see [0004, 0134]).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claims 4, 7-11, 13 and 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bryning as applied to claim 1 above.

11. Regarding claim 4, the reference Bryning discloses that when a sample is in the inlet chamber 302 and centripetal force is used to force the sample 303 from the chamber 302 to PCR chamber 306, the chamber 306 can be sealed from the inlet chamber 302 by forming a barrier wall 338 (see [0135]). There is a top cover film on the assembly to tightly seal the series of chambers from one another and from the environment (see [0140]). It is interpreted by the examiner that the barrier wall and the top film cover that is formed is one that is able to trap gas. Bryning does not disclose gas being trapped in the reservoir. It would have been obvious to one having ordinary skill in the art at the time the invention was made to trap gas within the system while centrifuging the sample down to various chambers and channels so that with the addition of a gas in the chamber, mixing or separation can occur with the gas and sample without the risk of human or environment contamination.

12. Regarding claims 7-8, the reference Bryning discloses the assembly as represented by Figure 18, where the chambers, reservoir and channels are arranged in a sequence where they are arranged one right after the other (see Figure 18]). Bryning does not disclose the direction of the reservoir to be between 20 and 30 degrees from the straight line that intersects the inlet and outlet portion. It would have been obvious to one having ordinary skill in the art at the time the invention was made to arrange the forward and reverse sequence reaction chamber 324 and 326 in such a way not in a straight line, in a direction that is angled from 10 to 40 degrees, more particularly 20 to

30 degrees, with the straight line that intersects the inlet and outlet portions of the chambers to initiate flow and separation in different direction when subjected to processes like centrifugation.

13. Regarding claims 9-10, the reference Bryning discloses the claimed invention except for defining the volume capacity of the first sample containment feature and reservoir. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the reservoir define a volume that is from about 10% to about 100%, in particular about 25% to about 75%, of the volume of the first sample containment feature, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

14. Regarding claim 11, the reference Bryning discloses the claimed invention except for where the device is disk shaped and includes an axis of rotation. Bryning discloses in another embodiment where there is a disk-shaped fluid manipulating assembly where there is a plurality of radially extending series of recesses in the substrate. Centripetal force can be used by spinning the assembly 180 to effect radial movement of fluids through the series of chambers (see [0027, 0120]). It is interpreted by the examiner that in a disk shaped assembly that is subjected to centripetal force, there is an axis of rotation. It would have been obvious to one having ordinary skill in the art at the time the invention was made to place the embodiment in Figures 17-29 onto a disk as see in Figure 13 with multiple microfluidic assemblies in a disk formation

that is subjected to centrifugation for multiple PCR reactions to occur simultaneously saving time in the laboratory.

15. Regarding claim 13,the reference Bryning discloses claimed invention except for the system to be on a platen comprising an axis of rotation and the reservoir extends toward the axis of rotation. Bryning discloses in another embodiment in Figure 13, where there is a fluid-shaped fluid manipulating assembly where there is a plurality of radially extending series of recesses in the substrate. The assembly includes a substrate 183 and a central hole 188, where it can be subjected to centripetal force to effect radial movement of fluids through the series of chamber in the substrate (see [0120]). It is interpreted by the examiner that an embodiment that is disk shaped assembly that is on a substrate is on a platen, or a flat plate that is subjected to rotation in centrifugation for support. It would have been obvious to one having ordinary skill in the art at the time the invention was made to arrange the disk shaped assembly of chamber, reservoir and recesses where the reservoir is in the direction of the axis of rotation so that when under centrifugation, the sample or liquid flows from the reservoir toward the first sample containment feature to allow the reaction to occur.

16. Regarding claim 15, the reference Bryning discloses the claimed invention except for the sample processing pathway comprises of 48 or more processing pathways. Bryning discloses in various embodiments that can include 48 or 96 series or reaction chamber with each series having an independent inlet port. It would have been obvious to one having ordinary skill in the art at the time the invention was made to connect the independent chamber with processing pathways to conduct experiments

where a sample or liquid can flow from one chamber to the other where reactions can occur. Furthermore referring to Figure 18, each individual microfluidic assembly has about 5 pathways per assembly. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have multiple microfluidic device assembly in a disk shape with pathways where are multiple assemblies so that there are more than 48 pathways in the entire assembly for fluid communication between chambers for multiple reactions can occur simultaneously and the contents of the device can be well mixed upon centrifugation through many channels and chambers.

17. Regarding claim 16, the reference Bryning discloses the claimed invention except for the dimensions of the first sample containment feature and reservoir. Bryning discloses that the assembly can be sized to be conveniently processed by a technician that can have a length from about one inch to ten inches. Depending on the number of series of chamber or configuration desired, the assembly can have an appropriate size (see [0069]). It would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the assembly of the appropriate size for the reservoir that is less than or equal to about 500 micrometers, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch,* 617 f.2d 272, 205 USPQ 215 (CCPA 1980).

18. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bryning as applied to claim 5 above.

19. Regarding claim 6, the reference Bryning discloses a top cover film 360 and a bottom cover film 361 on the assembly in Figure 29 where the top cover film 360 and bottom cover film 361 can fluid-tightly seal the series of chambers from one another and the environment (see [0140]). Bryning does not disclose gas disposed in the reservoir. It is interpreted by the examiner that the top and bottom cover films are capable of trapping gas in the reservoir of the assembly during construction. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the top and bottom cover films seal the chambers from the environment and trap gas in the reservoir to aid in the transfer of samples or liquids from one chamber to the other for efficient movement in the assembly from one chamber to the other while being continuously be mixed with the aid of the trapped gas.

20. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bryning as applied to claim 11 above.

21. Regarding claim 12, the reference Bryning discloses the claimed invention except for where the reservoir extends in a direction towards the axis of rotation. It would have been obvious to one having ordinary skill in the art at the time the invention was made to arrange the exhaust vent to be closer to the central axis to the disk and the inlet further as seen in Figure 13 where the inlet and exhaust are arranged in v-shaped inlet chambers to aid in the mixing of samples with reagents.

22. Claims 17-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bryning.

23. Regarding claim 17-18, the reference Bryning discloses the claimed invention except for the sample containment features formed in the substrate. Bryning discloses a microfluidic assembly and system for manipulating fluid samples (see abstract). The microfluidic manipulation assembly that is provided has a fluid manipulating assembly (top surface) and an assembly support platform. The fluid manipulating assembly is on the assembly support platform (bottom surface). The fluid manipulation assembly that is provided has two or more recesses (processing pathways) separated by one or more intermediate walls. In various embodiments of the assembly, the recesses are partially defined by an opposing wall surface portion. It is interpreted by the examiner that the recesses defined by the opposing wall portion are at least partially defined by the substrate, which for the purposes of containing samples and fluids within the containment features, the chambers can be made to be formed in the substrate. Referring to Figures 17-29, there is an inlet chamber 302 that can be used as a polymerase chain reaction setup well (first sample containment feature with an inlet and outlet) that flows into a channel 304 (fluid communication valve) that is opened. From the channel 304 under centripetal force, a sample can be forced into a polymerase chain reaction chamber 306 (second sample containment feature). After sufficient thermal cycling for PCR in the PCR chamber 306, a PCR outlet channel 308 that is initially blocked or closed is opened to force the sample into the purification column. At the opposite end of the assembly, there is a reverse sequencing reaction product

chamber 326 (reservoir) that is in fluid communication with the inlet through a series of sequential chambers and channels (see [0004, 0005, 0009, 0134, 0135]). It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the chambers, pathways or recesses in the in substrate on the underside of the substrate to secure the sample in the substrate from one chamber to the next without worrying about spillage or contamination from one chamber to the next.

24. Regarding claim 19, the reference Bryning discloses the claimed invention except for gas disposed in an elongated reservoir where it is capable of assisting a transfer of the liquid from the containment features. Bryning discloses the assembly with a top cover film 360 that can fluid-tightly seal the series of chambers in the assembly and the environment (see [0140]). It would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the assembly with the cover while trapping gas in the reservoir to aid in the separation, mixing or sustainability of the mixture content of the sample being forced down the assembly of chambers and open channels.

25. Regarding claims 20-21, the reference Bryning discloses the assembly where the chambers, forward and reverse sequencing reaction product chambers (reservoir) and channels are arranged in a sequence where they are arranged one right after the other in a straight line (see Figure 18]). Bryning does not disclose the direction of the reservoir to be between 20 and 30 degrees from the straight line that intersects the inlet and outlet portion. It would have been obvious to one having ordinary skill in the art at the time the invention was made to arrange the forward and reverse sequence reaction

chambers 324 and 326 in such a way, not in a straight line, in a direction that is at an angle from 10 to 40 degrees, more particularly 20 to 30 degrees, with the straight line that intersects the inlet and outlet portions of the chambers to initiate flow and separation in different directions when subjected to processes like centrifugation.

26. Regarding claims 22-23, the reference Bryning discloses the claimed invention except for defining the volume capacity of the first sample containment feature and reservoir. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the reservoir defined by a volume that is from about 10% to about 100%, in particular about 25% to about 75%, of the volume of the first sample containment feature, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

27. Regarding claim 24, the reference Bryning discloses the claimed invention except for where the device is disk shaped and includes an axis of rotation. Bryning discloses in another embodiment, there is a disk-shaped fluid manipulating assembly where there is a plurality of radially extending series of recesses in the substrate. Centripetal force can be used by spinning the assembly 180 to effect radial movement of fluids through the series of chambers (see [0027, 0120]). It is interpreted by the examiner that in a disk shaped assembly that is subjected to centripetal force, there is an axis of rotation during spinning. It would have been obvious to one having ordinary skill in the art at the time the invention was made to place the embodiment in Figures 17-29 onto a disk as see in Figure 13 with multiple microfluidic assemblies in a disk

formation that is subjected to centrifugation so that multiple PCR reactions can occurring saving time rather than conducting one experiment at a time.

28. Regarding claim 25, the reference Bryning discloses the claimed invention except for where the reservoir extends in a direction towards the axis of rotation. It would have been obvious to one having ordinary skill in the art at the time the invention was made to arrange the exhaust vent to be closer to the central axis to the disk and the inlet further as seen in Figure 13 where the inlet and exhaust are arranged in v-shaped inlet chambers so that fluids in the reservoir are able to travel with ease and no inhibitions through the device.

29. Regarding claim 26, the reference Bryning discloses the claimed invention except for where the platen is secured to the device. Bryning discloses in another embodiment in Figure 13, there is a fluid-shaped fluid manipulating assembly where there is a plurality of radially extending series of recesses in the substrate. The assembly includes a substrate 183 and a central hole 188, where it can be subjected to centripetal force to effect radial movement of fluids through the series of chamber in the substrate (see [0120]). It is interpreted by the examiner that an embodiment that is disk shaped assembly that is on a substrate is on a platen, or a flat plate that is subjected to rotation in centrifugation. It would have been obvious to one having ordinary skill in the art at the time the invention was made to arrange the disk shaped assembly of chambers, a reservoir and recesses where the reservoir is in the direction of the axis of rotation so that when under centrifugation, the sample or liquid flows from the reservoir toward the first sample containment feature to allow the reaction to occur. Furthermore,

it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a holder securing the device to the platen to ensure a stable base for the device to be mounted on during centrifugation.

30. Regarding claim 27, the reference Bryning discloses the claimed invention except for including a drive assembly capable of rotating the platen about the axis of rotation. Bryning disclosed a disk-shaped fluid manipulating assembly that can be subjected to spinning the assembly to incur centripetal force to effect radial movement of fluids through the series of chambers (see [0120]). It would have been obvious to one having ordinary skill in the art at the time the invention was made to include a drive assembly that is used to subject the disk-shaped assembly to centrifugation as opposed to using human force during centrifugation for more efficient separations or mixtures of samples or fluids in the device.

31. Regarding claim 28, the reference Bryning discloses the claimed invention except for the distal end portion of the reservoir is closer to the axis of rotation than the first sample containment feature. Bryning discloses the device in Figures 17-29 where the inlet portion 302 is at the opposite end of the device as the forward and reverse sequencing reaction product chambers. It would have been obvious to one having ordinary skill in the art at the time the invention was made to arrange the device in a disk-shape with the forward and reverse sequencing reaction product chambers closer to the axis of rotation than the containment feature to initiate flow of products or reactant through the device upon centrifugation.

32. Regarding claim 29, the reference Bryning discloses the claimed invention except for a central axis of rotation. Bryning discloses disk-shaped fluid manipulating assembly on a substrate, a pressure sensitive adhesive layer and a cover layer. The assembly includes a central hole to facilitate supporting the assembly on a position and/or support unit (see [120]; Figure 13a and 13b). It is interpreted by the examiner that since the substrate, adhesive layer and cover layer are on top of each other that share a central hole, it is assumed that they are on the same central axis of rotation if subjected to centrifugation. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the device include a central axis of rotation so that upon centrifugation of the device, there is a smooth spinning motion mixing and/or separating fluid or samples, instead of a lopsided uneven motion.

33. Regarding claim 30, the reference Bryning discloses the claimed invention except for a holder securing the device to the platen is coaxial and the reservoir extends toward the axis of rotation. Bryning discloses disk-shaped fluid manipulating assembly on a substrate, a pressure sensitive adhesive layer and a cover layer. The assembly includes a central hole to facilitate supporting the assembly on a position and/or support unit (see [120]; Figure 13a and 13b). It is interpreted by the examiner that since the substrate, adhesive layer and cover layer are top of each other that share a central hole, it is assumed that they are coaxial. It would have been obvious to one having ordinary skill to attach a holder onto the device that is coaxial, as the substrate, adhesive layer and cover layer are so that when subjected to centrifugation, the device can be placed on an apparatus by the central hole and centrifuged. Furthermore, it

would have been obvious to one having ordinary skill in the art at the time the invention was made to have the orientation of the device so that the reservoir closer to the axis of rotation so that the fluid or gas stored or trapped in the device can flow through the device upon centrifugation aiding in mixing or transfer of fluids.

34. Regarding claim 31, the reference Bryning discloses the claimed invention except for the sample containment features are formed in the substrate. Bryning discloses the fluid manipulation assembly with two or more recesses that are partially defined in the substrate. The recesses are in the form of inlet and outlet channels to and from PCR reaction chambers and columns. The PCR inlet chamber in the assembly can be see as 304, 308 and 318 (see [0004, 0134]). It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the sample containment features within the substrate of the device so that when the device is subjected to centrifugation for separating or mixing, the components are fully contained in the substrate where nothing is expelled through mishandling of the device.

35. Regarding claim 32, the reference Bryning discloses the claimed invention except for the sample processing pathway comprises of 48 or more processing pathways. Bryning discloses in various embodiments that can include 48 or 96 series or reaction chamber with each series having an independent inlet port. It would have been obvious to one having ordinary skill in the art at the time the invention was made to connect the independent chambers with processing pathways to conduct experiments where a sample or liquid can flow from one chamber to the other where reactions can occur (see Figure 13a and 13b). Furthermore, referring to Figure 18,

each individual microfluidic assembly has about 5 pathways per assembly. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have multiple microfluidic device assembly in a disk shape with pathways where are multiple assemblies on the disk so that there are more than 48 pathways for fluid communication between chambers for further mixing and/or separation of fluids or samples.

36. Regarding claim 33, the reference Bryning discloses the claimed invention except for the dimensions of the first sample containment feature and reservoir. Bryning discloses that the assembly can be sized to be conveniently process by a technician that can have a length from about one inch to ten inches. Depending on the number of series of chamber or configuration desired, the assembly can have an appropriate size (see [0069]). It would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the assembly of the appropriate size for the reservoir that is less than or equal to about 500 micrometers, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch,* 617 f.2d 272, 205 USPQ 215 (CCPA 1980).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christine T. Mui whose telephone number is (571) 270-3243. The examiner can normally be reached on Monday-Friday 8-5; Alternate Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on (571) 272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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CTM

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